

Department of Computer Science

08101 Programming I

Week 4 Laboratory 2013/2014

Before you go onto this lab, please make sure that you have sorted out the Cinema Entry program from last week and got loops working. This lab builds upon the program, and you need to have a working entry program to start from when you want to do this part.

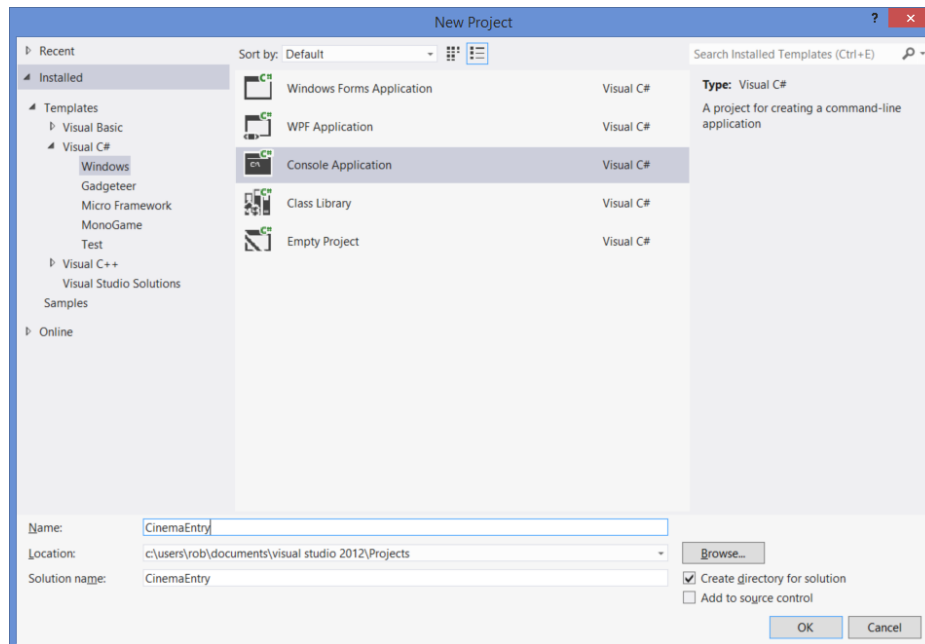
Using Visual Studio 2012

We have seen that we can write C# programs by typing in the program code using Notepad and compiling it using the `csc` compile command. However, this is not best way to write code. So today we are going to start using the Visual Studio *Integrated Development Environment*. This tool is a “word processor” for programs. You can use it to create, compile, run and debug your C# programs. We are going to start by making a new project.

Creating a New Project



1. Log in and start up Visual Studio 2012. You can find it in the programs on the Start menu. You might have to wait a little while for it to start up. If it asks you what “role” you want to use the correct answer is “C# Developer”.
2. Use **File>New>Project** to open the New Project dialogue. The dialog you see might not exactly match the one below, but it will have a C# type which contains a Windows Console Application template. Be careful not to create a Visual Basic project as this would be very confusing.
3. Give the project the name **CinemaEntry**. Ensure that the project is being stored on the G: drive. You may want to press the **Browse** button so that you can select a suitable location for your project.



Note: The New Project dialog you can see above is for my installation of Visual Studio 2012 Express Edition. The one on your machine, or in the labs, will have a dialog that looks similar to this, but there may be some differences. Just make sure that you find **Visual C#>Windows>Console Application**.

When you click OK the project will be created and opened for you to work with. The first thing we are going to do is create a method and test it using Visual Studio.

Adding a ReadNumber method

We are now going to make our final improvements to the Cinema Entry program. We are going to add a method to the program to make it easier to read numbers. The method will accept a string and two integers. It will use the string as a prompt for the user and reject any input values which are smaller than the minimum or larger than the maximum. A programmer has written a method do this:

```
static int ReadNumber(string prompt, int min, int max)
{
    int result = 0;
    do
    {
        Console.Write(prompt);
        string numberString = Console.ReadLine();
        result = int.Parse(numberString);
        if (result > max && result < min)
            Console.WriteLine("Please enter a value in the range " +
                min + " to " + max);
        else
            break;
    } while (true);
    return result;
}

static void Main(string[] args)
{
    int filmNumber = ReadNumber("Enter film number: ", 1, 6);
    Console.WriteLine("Film number " + filmNumber + " chosen");
}
```

}

Above you can see the `ReadNumber` method and a `Main` method that calls it. Enter the method and the `Main` method into your new C# project.

Running the Program

We now have a program we can run.



1. Press F5 to run the program.
2. Visual Studio will compile and run the code for you. A command window will open on the screen.
3. You can enter the data into the command and the program will work in the same way as it did from the command prompt.
4. When you enter the last value however the program command prompt will close as Visual Studio will end execution.

Pausing the Display

The program above will work fine, but it will clear the screen as soon as it finishes, which means that you might not see what you have entered. One way to solve this problem is to read an empty line at the end of your program:

```
Console.WriteLine("Press return to exit");  
Console.ReadLine();
```

These two statements display a message and then wait for the user to press enter, giving us a chance to see what it did.



1. Add the two statements to the end of the `Main` method so that it pauses and gives you a chance to see what the program displayed.

Testing the ReadNumber method



The `ReadNumber` method looks OK, but it might have a problem or two. If you run it with a sample value in the range 1 to 6 it seems OK, but it doesn't seem to notice invalid values:

```
Enter film number: -1  
Film number -1 chosen  
Press return to exit
```

To fix this we can add a breakpoint and step through the code to find the bug.



1. In Visual Studio click in the left margin of the line
`int result = 0;`
2. If you do this correctly a brown dot should appear in the margin and the line should be highlighted in brown to indicate that a breakpoint has been placed at this line.
3. Press F5 to run the program and note that it stops at this line.
4. Make sure that the values of `min` and `max` have been set correctly by hovering over them and looking at the numbers that are displayed.

5. You can press the  button to step through the program a line at a time. Check each line and make sure that it is what you would expect. Pay special attention to the condition. Test it with the values that have been entered.
6. To fix the problem you will have to stop the program. Press  to do this and then make the correction.
7. Remove the breakpoint by clicking on it again.
8. Run the program and test that it works. A good set of test data is the values **-1, 0, 1, 3, 5, 6, 7, 1000**. Make sure the program works with all those values.

Once you have a program that passes all the tests above you can move on to use the method in your Cinema Entry program.

Putting your Cinema Entry code into the new project

At this point you should have a Visual Studio project that contains a `Main` method that tests the `ReadNumber` method. The next thing you want to do is put your program into the Visual Studio version and then change it so that it uses `ReadNumber` to read the values in.



1. Start a command prompt and open up your original program in Notepad.
2. Use the mouse to select the content of the `Main` method in your original program.
3. Use `CTRL+C` to make a copy of this text.
4. Move to the Visual Studio project and select the content of the `Main` method in that project.
5. Use `CTRL+V` to copy the `Main` method over the one in the Visual Studio project.

Finishing the program

Now you can use this method when you want to get the age and film number in your program. You can even use it to get other information, for example the user could respond with a number to questions like the following:

Do you have an adult with you? (1 for yes, 0 for no):

This should allow you to produce the perfect program.

eBridge Lab Summary

Don't forget to go onto eBridge and do the summary test for this lab.

Rob Miles

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